

Global Impacts and Challenges of Paperless Books: A Preliminary Study

Chiang-nan Chao

Niall Hegarty

Abraham Stefanidis

St. John's University
USA

Abstract

This study focuses on comparing the different perceptions between ebooks and printed books, as the ebooks are now rapidly challenging the traditional publishing market globally. This study, through an empirical survey to examine from the consumers' standpoints, focuses on a range of managerial issues about ebook adoptions. These managerial issues will not only be strategic to the publishing industry's bottom line, but also shape our future environment. The study finds ebooks have significant advantages in many aspects over the printed books. Although ebook adoption is growing rapidly, in some ways, it still lacks some of the advantages existed in printed books, e.g. there are many different and incompatible platforms for the usage of ebooks, and the consumers do not need to have the concern of copyright for printed books. The findings of this preliminary study suggest that publishers may need to more aggressively promote ebooks not only as a way to reduce the cost, but also as a way to preserve our global environment.

Keywords: environment, paper industry, electronic books, digital books, printed books vs. ebooks

Introduction

The printed books have been around for two thousands of years since the Chinese first invented paper that was made of mostly from linen and straw. The paper industry relies heavily now on trees for its product, and it was reported that primary forest area was reduced globally by 60,000 square kilometers per year, about the size of Ireland [greenfacts.org, 2009]. The paper industry and other non-lumber products consumed 1.6 billion trees, or 300 million tons of paper each year or 43 percent of the total tree consumption globally [understory.ran.org, 2008]. The U.S., which contains only 5 percent of the world's population, uses 30 percent of all paper, and the forest and paper products industry generates \$200 billion dollars in sales every year, accounting for 7 percent of the total manufacturing output of the United States. About 28 percent of all wood cut in the U.S. is used for papermaking [ecology.com, 2011].

Ebooks that do not use paper are emerging from an almost zero ten years ago, to today's total sales of \$969.9 million US\$ in 2011 and has grasped 16.55% of the total sales of books [mediabistro.com, 2012]. The emergence of ebooks is challenging the traditional way of publishing and reading, the academic research in this area is still quite limited due to this emerging nature of ebooks. This study, in an empirical setting, examines from the book readers' points of views and their preferences, in order to provide some managerial insights of this ebook market: what consumers prefer and how they make purchasing decisions. The focus is mainly on the ebooks and digital publishing related issues.

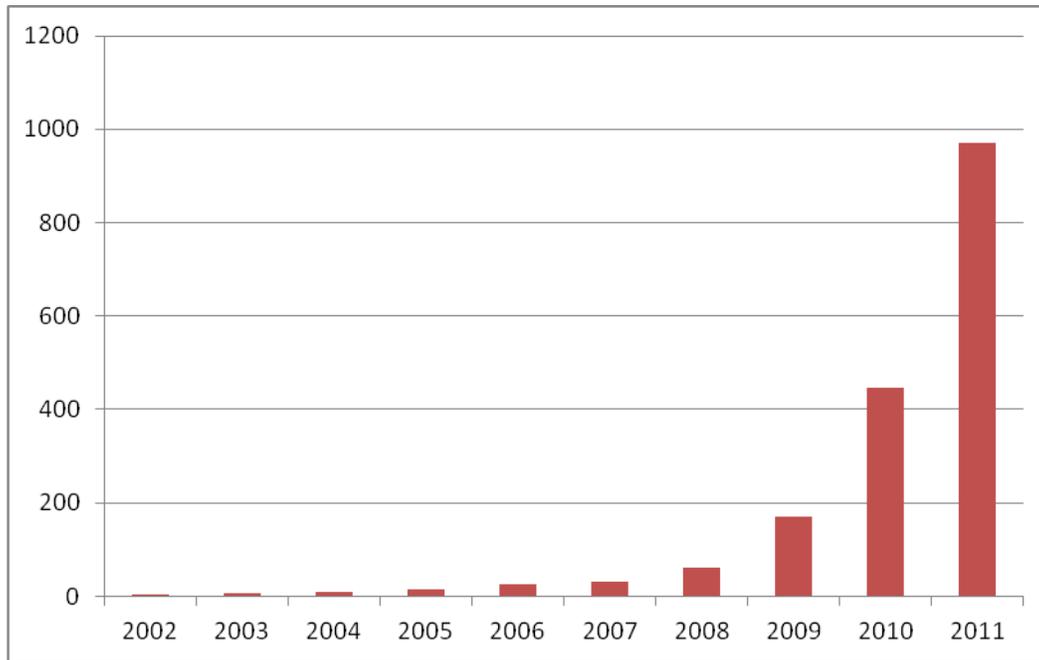
This study attempted through an empirical exploration to investigate if there were any differences resulted from the consumers' viewpoints between ebooks and printed books, with major focuses on products and their qualities, price (including promotions), deliveries and usability. The study hoped to find, if any, the impacts of the emerging ebooks on the publishing industry, on book readers and their reading behavior, either professors or students, on our society and environment.

Review of Literature

In the recent years, the traditional printed publishing industry is facing an emerging challenge from digital publishing, quite resembling the competition between filmed cameras and digital cameras, even though the digital publishing represents only a small fraction of the total publishing industry's sales at the moment.

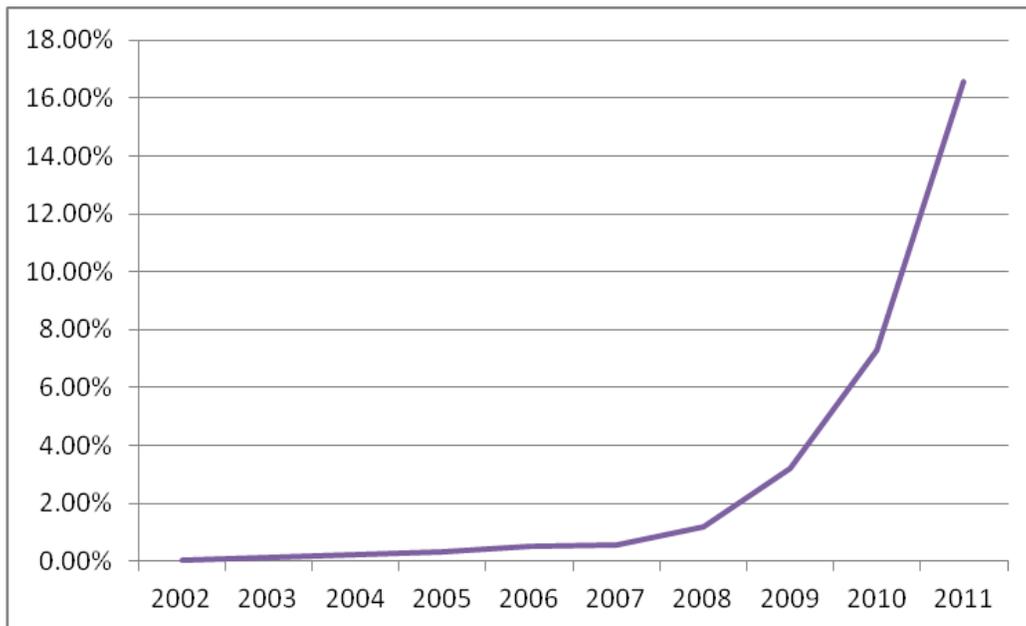
However, some of the printed publishing, i.e. newspapers, have experienced a sharp decline recently. Figure 1 documents the emerging sales of ebooks in the U.S. Figure2 presents the ebook market share in the past ten years.

Figure 1. Ebook sales, in mil. of US\$



Source: http://www.mediabistro.com/ebooknewser/aap-reports-ebook-sales-up-72-in-december_b20563, 2012

Figure 2. Ebook market shares, %



Source: http://www.mediabistro.com/ebooknewser/aap-reports-ebook-sales-up-72-in-december_b20563, 2012

While the revenues in e-publishing are growing rapidly, the total sales amount is still far below that of printed publications.

However, some of the printed publishing, i.e. newspapers, have experienced a sharp decline recently. Contrary to traditional printed publishing, the digital publishing market needs both reading gadgets and ebooks. As far as the selection of digital gadgets, consumers have quite a number to choose from, from tiny gadgets, such as iTunes, Blackberry, iPod touch, and iPhones, to specially manufactured ebook readers, i.e. Amazon's Kindles, Sony's eReaders, Barnes and Noble's Nooks, Samsung's Galaxy, etc, to generic tablets like Apple's iPad, netbooks and laptops, and desktop computers. There are no universal standards for the ebooks, just like with printed books which have a variety of type settings. For many people, the problem with ebooks is that they come loaded with just many limits. Ebooks bought today from Amazon.com, for example, can be read mostly on Amazon's Kindle. Some restrictions on the use of ebooks are likely to remain a fact of life for some time to come. Because of this, some potential ebook customers shy away from jumping on the band wagons of ebooks. In addition, there is no single technology standard for ebooks, even though the front runners like Amazon tend to dominate in the nascent market. Many publishers are concerned about incompatibility of these gadgets, and wonder that gadget will eventually become dominant, since it will have profound impacts if they select wrong formats. Some developers believe that there is a limit to people's appetite for new digital media. The dominant operating systems are currently either Apple's or Android of Google, with Apple's system is in a dominant position in the tablet category as the first three day sales of new iPad totaled 3 million [Warner, 2011, Graham, 2012].

To make the situation more complicated, often digital gadget makers, publishers, and book retailers disagree with one another so it is difficult to develop new business models for profit-cost sharing. Dominant players often pressure others to go along with their terms. Amazon has tussled with publishers recently over ebook prices, but a new pricing model that is emerging could improve Amazon's profit margin on ebooks for any e-readers. Publishers will set prices for many ebooks, with retailers such as Amazon and Apple taking 30% of the revenue. This pricing model guarantees a profit on every sale. Amazon's previous policy of discounting new ebook best sellers at \$9.99 typically resulted in losses, since it paid more than \$9.99 for those books. What's more, Amazon is years ahead of Apple in building relations with the publishing industry, being one of the biggest print-book retailers in the nation. Amazon now offers more than 450,000 ebooks, and has access to more than 1.8 million free out-of-copyright titles. Apple has said it will start with 60,000 titles from five of the largest publishing houses. A new approach proposed by Apple intends to let every player in the distribution channel to collect a fee or commission. Apple's app stores enable the company to collect commission on every book or magazine sold, and the stores generated over \$1.1 billion in eighteen months to February 2011. Apple is now requiring publishers that conduct sales of content—which includes books as well subscriptions—to offer a way to do so within apps, which will be handled by the iTunes billing system. The policy, which the company says isn't new, was cited in Apple's rejection of a Sony Corp. app for reading ebooks earlier this week [Trachtenberg, 2010a; Fowler & Trachtenberg, 2010; Kane and Vascellaro, 2011; Checkler, et al, 2011].

Barnes & Noble Inc. has stepped onto the nascent digital-book battleground with Amazon.com Inc. and Sony Corp., saying it would launch its own ebookstore with bestsellers priced at \$9.99, in line with its rivals. It would offer more than 700,000 titles, including more than 500,000 public domain books from Google Inc., and that it expects to be able to offer more than one million titles by July 2010. Book formats supported by the new Barnes & Noble ebookstore include those that can be viewed on Apple Inc.'s iPhone and iPod Touch, BlackBerry smartphones and most Windows and Mac computers. However, titles bought through Barnes & Noble's ebookstore are not compatible with Sony's Reader or Amazon.com's Kindle ebook reader, the two dominant e-readers in the U.S. market. The largest booker retailer declined to share the readers' information with publishers [Rich and Stone, 2010; Trachtenberg, 2010b; Bilton, 2011; Greenfield, 2012].

Despite the complications in the publishing market, both book resellers and publishers want to provide their customers with an alternative of ebooks. In addition to bring about new titles in a digital format, they republish old titles by big-name authors. These approaches further enable the demand growth of ebooks [Kane and Fowler, 2010].

Printed books and magazines on the other hand are in the low technology, but the screens won't go blank, nor would they be transacted virus, and they have been around for thousands of years. However, they are heavy and expensive. For example, college students pay \$700 to \$900 a semester in addition to the already high expenses in tuition and other fees [Foderaro, 2010].

Methodology

With the focal questions in mind, this research studied the viewpoints of consumers with regards to how they view ebooks as compared to the traditional printed books, the books include all books, magazines, newspapers, and other related. A survey was developed to investigate the issues related to the subject of this study, in the consumer preferences on products and their quality, price and promotion, deliveries. The following variables were based on literature reviews.

Variable Selection and Survey Questionnaire

Stemmed from literature review, the following variables affect how and where consumers make their purchase decisions:

1. easy to obtain
2. low cost of possession of the reading materials
3. easy to read
4. attractive prices for possessing contents
5. easiness to carry around
6. weights
7. easy to share with others
8. need of special reading instruments, i.e. kindle, eReader, iPad, Galaxy, Nooks, etc.
9. free delivery or delivery incentives
10. compatibility in the formats
11. concern with copyright

These variables were served as cores in a survey questionnaire designed to collect the consumers' opinions, paired both in digital books and printed books. The questionnaire also included the background information of the respondents.

Sample, Data Collection, and Measurements

Due to the exploratory nature of this empirical study, the questionnaires were distributed to college students and some professors in a large university campus in the northeast for a convenient sampling since these respondents tended to browse on the websites and download digital books, therefore, would provide some meaningful insights to the publishing industry and book readers. The respondents were asked to evaluate the selected variables in a five point Likert scale, with 5=strongly prefer, 4=prefer, 3=neutral, 2 not prefer, and 1=strongly not prefer. Since the data collected are of interval scaling, the respondents were asked to provide their opinions on the paired variables, the Paired Sample *t*-Test was used to test the hypotheses.

Hypotheses and Test of Hypotheses

The hypotheses for this research were to find if there were significant differences from the consumers' viewpoints between ebooks and printed books. The hypotheses for this study state:

Hypothesis 1. There is no significant difference in "easy to obtain" between ebooks and printed books.

Hypothesis 2. There is no significant difference in "low cost of possession" of the reading materials between ebooks and printed books.

Hypothesis 3. There is no significant difference in "easy to read" between ebooks and printed books.

Hypothesis 4. There is no significant difference in "attractive prices for possessing contents" between ebooks and printed books.

Hypothesis 5. There is no significant difference in "easiness to carry around" between ebooks and printed books.

Hypothesis 6. There is no significant difference in "weights" between ebooks and printed books.

Hypothesis 7. There is no significant difference in "easy to share with others" between ebooks and printed books.

Hypothesis 8. There is no significant difference in "need of special reading instruments, i.e. kindle, eReader, iPad, Galaxy, Nooks, etc." between ebooks and printed books.

Hypothesis 9. There is no significant difference in "free delivery or delivery incentives" between ebooks and printed books.

Hypothesis 10. There is no significant difference in "compatibility in the formats" between ebooks and printed books.

Hypothesis 11. There is no significant difference in "concern with copyright" between ebooks and printed books.

Alternatively, there are significantly different preferences in these variables between ebooks and printed books from the consumers' viewpoints.

When two samples are involved and the values for each sample are collected from the same individuals (that is, each individual gives two values, one for each of the two categories), or the samples come from matched pairs of individuals, a paired-samples *t*-Test is an appropriate statistic to use. The paired samples *t*-Test can be used to determine if two means are different from each other when the two samples that the means are based on were taken from the matched individuals or the same individuals. The paired samples *t*-Test compares the means of two variables. This procedure computes the difference between the two variables for each case, and tests to see if the average difference is significantly different from zero, under the assumption of both variables should be normally distributed. The nulls should be rejected if the significance level is less than or equal to five percent in these criteria, in another word, five percent of the paired sample *t*-Test two-tailed probability level signifies the preferences for ebooks vs. printed books [Hamburg, 1977; Conover, 1980; Davis and Cosenza, 1985; SPSSX, 2002; Wikipedia, http://en.wikipedia.org/wiki/Student's_t-test].

Results

Over 600 respondents were surveyed at a college campus in the eastern U.S., with 226 completed responded for analyses, representing 37.67 percent of the total surveyed. Table 1 presents the general background information of the respondents. All the respondents had experience in downloading digital articles and/or books from websites. Table 2 presents online activities related to ebooks, digital newspapers, digital magazines, and gadgets of ereaders.

Table 1. Backgrounds of the Respondents

Demographic issues	Groups	Valid %
1. Age	<18	0.9
	18-35	97.3
	>35	1.8
2. gender	Male	58.4
	Female	41.6
3. Family annual income	<\$30k	22.3
	\$30-50k	16.1
	\$50-75k	23.7
	>\$75k	37.9
4. Education	high school	12.4
	College	80.0
	graduate	7.6
	Total	100

Table 2. Issues Related to Reading

	Response	Valid %
6a. have you ever read any book, newspapers, and magazines on computer or on any digital form?	Yes	90.3
	No	9.7
6b. do you have any e-readers, i.e. Amazon's Kindle, iPad, Nook, Sony's e-readers, or any other brand?	Yes	21.7
	No	78.3
7a. each week, how many hours on average do you spend on reading printed books, newspapers, magazines, including textbooks	<5	46.5
	5-10	35.4
	11-15	11.5
	16-20	2.7
	>20	4.0
7b. each week, how many hours on average do you spend on reading digital forms of books, newspapers, and magazines, including textbooks	<5	52.9
	5-10	26.7
	11-15	11.6
	16-20	4.9
	>20	4.0

Table 3 presents the Pair Sample *t*-Test results. Significant differences are found in ten of the eleven variables.

Table 3: Paired Sample *t*-Test Results for All Variables

	Mean dif. ebook-printed	<i>t</i>	<i>df</i>	Sig. (2- tailed)
1. <i>easy to obtain</i>	0.289	3.466	224	0.001
2. <i>low cost of possession of the reading materials</i>	0.563	6.972	223	0.000
3. <i>easy to read</i>	-0.380	-4.022	223	0.000
4. <i>attractive prices for possessing contents</i>	0.291	3.821	222	0.000
5. <i>easiness to carry around</i>	0.898	9.671	225	0.000
6. <i>weights</i>	0.208	2.330	225	0.021
7. <i>easy to share with others</i>	0.453	5.090	224	0.000
8. <i>need of special reading instruments, i.e. kindle, eReader, iPad, Galaxy, Nooks, etc.</i>	0.222	2.663	224	0.008
9. <i>free delivery or delivery incentives</i>	0.188	2.279	223	0.024
10. <i>compatibility in the formats</i>	0.133	1.878	224	0.062
11. <i>concern with copyright</i>	0.111	1.63	224	0.105

- Significance level is 2-tailed.

Managerial Implications and Recommendations

The Paired Sample *t*-Test results reject nine of the null hypotheses; therefore, the study concludes that there are statistically significant differences from the consumers' viewpoints between ebooks and printed books, when the significance levels are less than 5% in the nine out of the total eleven variables. These variables are: *easy to obtain; low cost of possession of the reading materials; easy to read; attractive prices for possessing contents; easiness to carry around; weights; easy to share with others; need of special reading instruments, i.e. kindle, eReader, iPad, Galaxy, Nooks, etc.; free delivery or delivery incentives.*

Additionally, the test results indicate that in eight out nine variables with significant differences in the respondents' preference, ebooks are favored over printed books. These variables include: *easy to obtain; low cost of possession of the reading materials; attractive prices for possessing contents; easiness to carry around; weights; easy to share with others; need of special reading instruments, i.e. kindle, eReader, iPad, Galaxy, Nooks, etc.; free delivery or delivery incentives.* This may suggest to the publishing industry, book readers and users, i.e. students and professors alike, to continuously focus on promoting and improving ebooks in these areas. The respondents favor printed books over ebooks in one variable: *easy to read.* It may suggest to the publishing industry, ebook reading gadgets makers will need to continuously refine the ebooks and reading gadgets in order to make them easier to read.

This study accepts two hypotheses in the variables of *compatibility in the formats and concern with copyright* as there are no statistically significance preferences between ebooks and printed books. This may suggest, from the consumers' viewpoints, it is less important for publishing industry focusing on this issue.

The adoption of ebooks has emerged as a great challenge to the printed book, not only because of its advantages, but also it helps make our environment greener. Publishers, book retailers, professors, students, and all readers should move to adaptation of ebooks in the future to protect our environment.

Limitations and Future Research

The academic research that focuses on ebooks is limited, and it may take some years before significant research publications are available. As a preliminary and exploratory research, this study may only provide some limited glimpses of the fundamental aspects of ebooks about the publishing industry, our reading behavior, our society, and our environment.

More in depth research work is needed in the future. Do consumers really need reading gadgets, or rather than generic tablet computers? Some of the respondents commented consumers might not need to spend much money on buying specially designed digital reading gadgets, such as Amazon's Kindles. Others commented that the sizes of gadgets could be a factor for purchasing decision: 10" of tablet computer like iPad2, vs. 5" of other eReaders, and/or battery life. These technological issues should also be addressed in the future.

Since this research, as it surveyed only college students, staffs and professors, and the use of a small convenient sampling, cautions must be made in trying to generalize the outcomes of the research.

References

- Bilton, Nick, A Race between Digital and Print Magazines, NY Times, February 4, 2011.
- Checkler, Joseph, Eric Morath, and Jeffrey A. Trachtenberg, Borders Files for Chapter 11 Bankruptcy Protection, the Wall Street Journal, February 16, 2011.
- Conover, W. J., *Practical Nonparametric Statistics*, 2nd ed., New York: John Wiley & Sons, 1980: 213-337 & 344-384.
- Davis, D., & R. M. Cosenza, *Business Research for Decision Making*, Boston, Kent Publishing Company, 1985.
- Fowler, Geoffrey A. and Jeffrey A. Trachtenberg, Barnes & Noble Adds Color, Web to Nook, the Wall Street Journal, October 27, 2010.
- Foderaro, Lisa W., In a Digital Age, Students Still Cling to Paper Textbooks, NY Times, October 19, 2010.
- Graham, Jefferson, Apple sells 3 million new iPads in 3 days, *USA TODAY*, March 19, 2012
- Greenfield, Jeremy. Barnes & Noble Has No Imminent Plans to Share More Data with Publishers, Digital Book World, March 16, 2012
- Hamburg, M. *Statistical Analysis for Decision Making*, 2nd ed., Harcourt Brace Jovanovich, Inc., New York, 1977, pp. 219- 538.
- <http://understory.ran.org/2008/04/22/how-many-trees-are-cut-down-every-year/>, 2008
- http://www.ecology.com/2011/09/10/paper-chase/http://www.opene-book.org/doc_library/industrystats.htm, 2011.
- <http://www.greenfacts.org/en/forests/index.htm#2>, 2009
- http://www.opendigitalbook.org/doc_library/industrystats.htm, 2012
- http://www.mediabistro.com/ebooknewser/aap-reports-ebook-sales-up-72-in-december_b20563, 2012
- Kane, Y. I., and Geoffrey A. Fowler, For Amazon, Arrival of the iPad Opens Door to More digital book Sales, *the Wall Street Journal*, April 2, 2010.
- Kane, Y. I. and J. E. Vascellaro, Apple to Tighten Control on Content, *the Wall Street Journal*, February 3, 2011
- Rich, M., & Stone, B. Digital book Price Increase May Stir Readers' Passions, *NY Times*, February 11, 2010
- SPSS^x, *Advanced Statistics*, 7.5. Chicago, IL: SPSS Inc. 2002.
- Trachtenberg, J. A., & Fowler, G. A. Digital book Pricing Put Into Turmoil, *the Wall Street Journal*, January 30, 2010, a.
- Trachtenberg, Jeffrey A., New Digital Book Pricing Model Adopted in Fits and Starts, *the Wall Street Journal*, April 1, 2010 b.
- Warner, Melodie, Tablets Sapping PC Demand, Gartner Says, the Wall Street Journal, March 3, 2011.
- Wikipedia, http://en.wikipedia.org/wiki/Student's_t-test.